MIFARE EXAMPLES

Version 1.0

Download link:
https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr-mf-examples-c_sharp.git

Table of contents

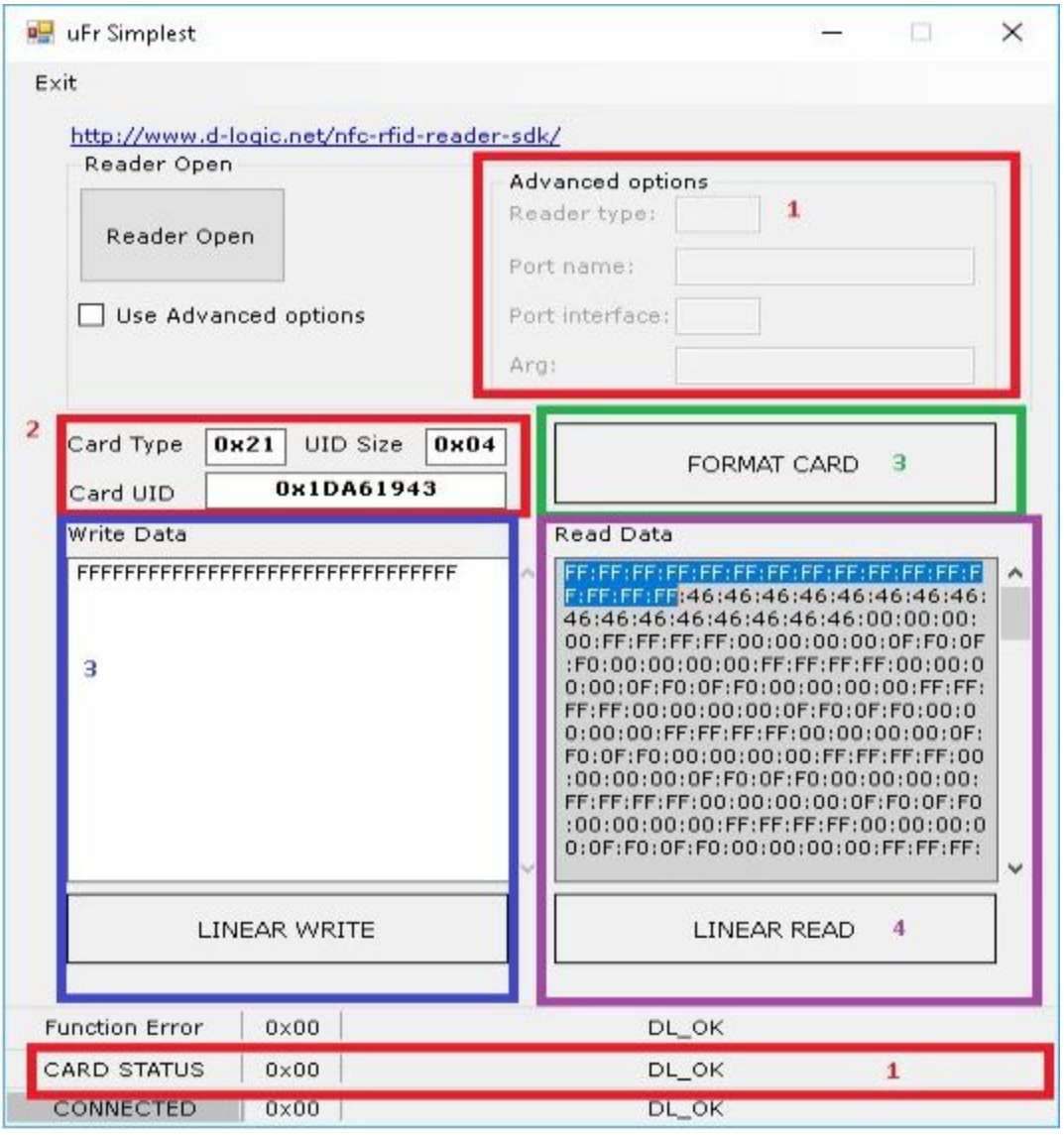
About

You will see 3 different applications:

- Simplest - It reads card UID, card type, reads/writes linear data on card. It can also format card with transport keys (FF FF FF FF FF FF).
- Simple - same as simplest with added option of reader UI signals, reader type and serial number and card authentication option.
- Advance - same as simple with more authentication option, which will be explained further in the manual.

for work with MIFARE® cards.

Simplest



1. ReaderOpen and ReaderOpenEx

This part of our application is used for opening communication with our uFR series reader. We implemented 'Advanced options' in which you input arguments necessary for our ReaderOpenEx() function. All you need to do is check the 'Use Advanced options' and provide data in specified fields. If use of Advanced options is not checked, our application will call standard ReaderOpen() function and will try to find reader connected to your PC.

2. Card type and UID

After putting a card on the reader you will be able to see card type, uid, and uid length in bytes, also CARD_STATUS will be changed from NO_CARD to DL_OK.

3. Format card

If you click button 'FORMAT CARD', all data on the card will be erased and all sector keys will be set to 0xFFFFFFFFFFFF - 6 bytes.

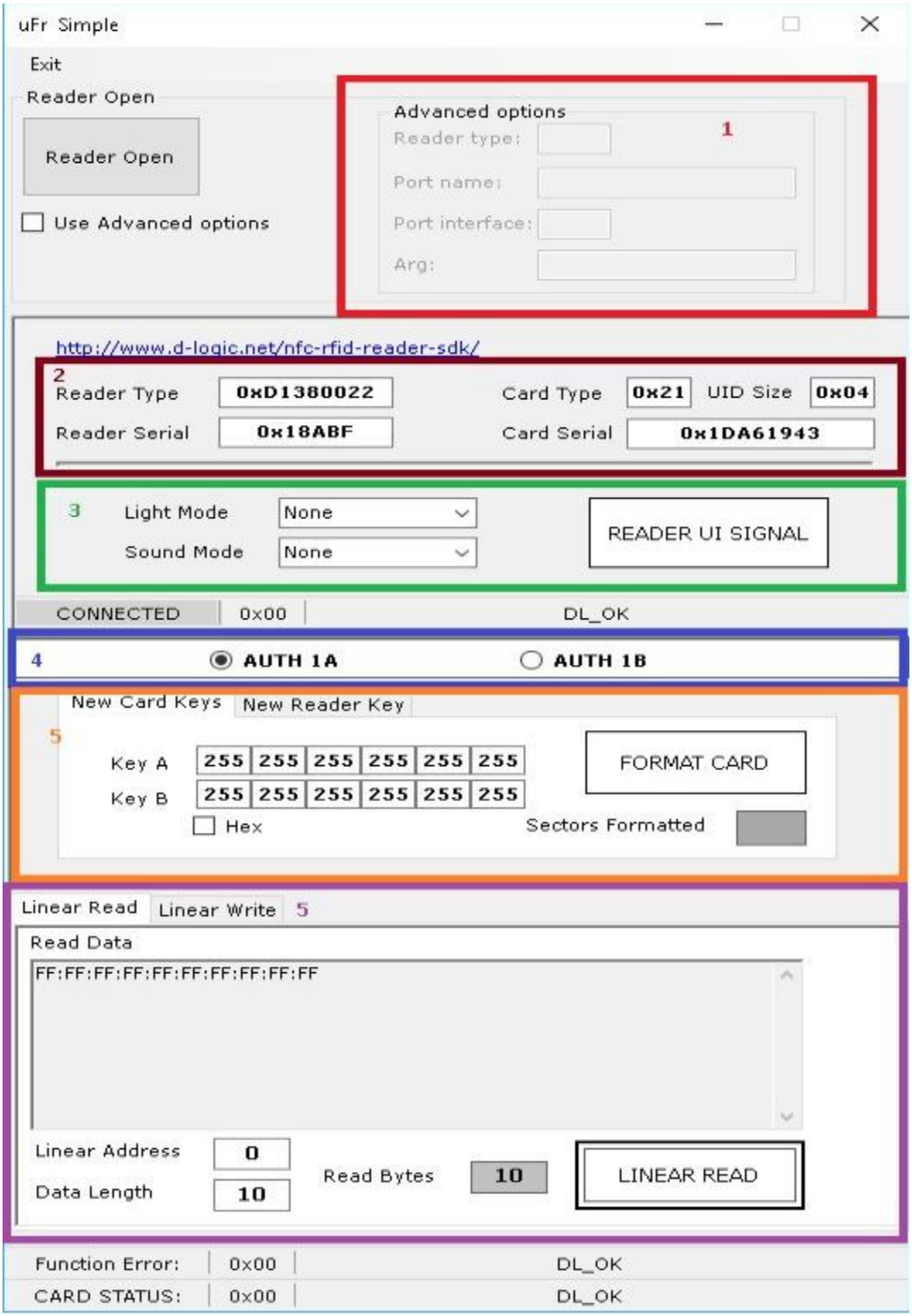
4. Linear write

For example, we will write 0xFFFFFFFFFFFFFFFFFFFF - 10 bytes to card. Just write bytes into text box as shown on the picture and click "LINEAR WRITE".

5. Linear read

If you click button 'LINEAR READ' you will be able to see all data on the card as shown on the picture. After clicking 'FORMAT CARD' and erasing all data from card we are now able to see only 10 bytes that we have wrote in the LINEAR READ text box.

Simple


uFr Simple
Exit
Reader Open
Reader Open
Use Advanced options
Advanced options
Reader type:
Port name:
Port interface:
Arg:
1
http://www.d-logic.net/nfc-rfid-reader-sdk/
2
Reader Type
0xD1380022
Card Type
0x21
UID Size
0x04
Reader Serial
0x18ABF
Card Serial
0x1DA61943
3
Light Mode
None
Sound Mode
None
READER UI SIGNAL
CONNECTED
0x00
DL_OK
4
AUTH 1A
AUTH 1B
New Card Keys
New Reader Key
5
Key A
255 255 255 255 255 255
Key B
255 255 255 255 255 255
Hex
FORMAT CARD
Sectors Formatted
Linear Read
Linear Write
5
Read Data
FF:FF:FF:FF:FF:FF:FF:FF:FF:FF
Linear Address
0
Data Length
10
Read Bytes
10
LINEAR READ
Function Error:
0x00
DL_OK
CARD STATUS:
0x00
DL_OK

1. ReaderOpen and ReaderOpenEx

This part of our application is same as the one in our Simplest example, it's used for opening communication with our uFR series reader. We implemented 'Advanced options' in which you input arguments necessary for our ReaderOpenEx() function. All you need to do is check the 'Use Advanced options' and provide data in specified fields. If use of Advanced options is not checked, our application will call standard ReaderOpen() function and will try to find reader connected to your PC.

2. Reader type, reader serial, card type and UID

After opening application and putting card on the reader you will see reader type and serial number, card type, card uid and card uid size represented as hexadecimal numbers as shown on the picture.

3. Reader signalization

You can choose reader light and sound mode from combo boxes and after clicking 'READER UI SIGNAL' signalization will be visible and you can hear sound from speaker.

4. Authentication mode

You can choose between authentication with key A or authentication with key B by clicking on radio boxes in section number '3'.

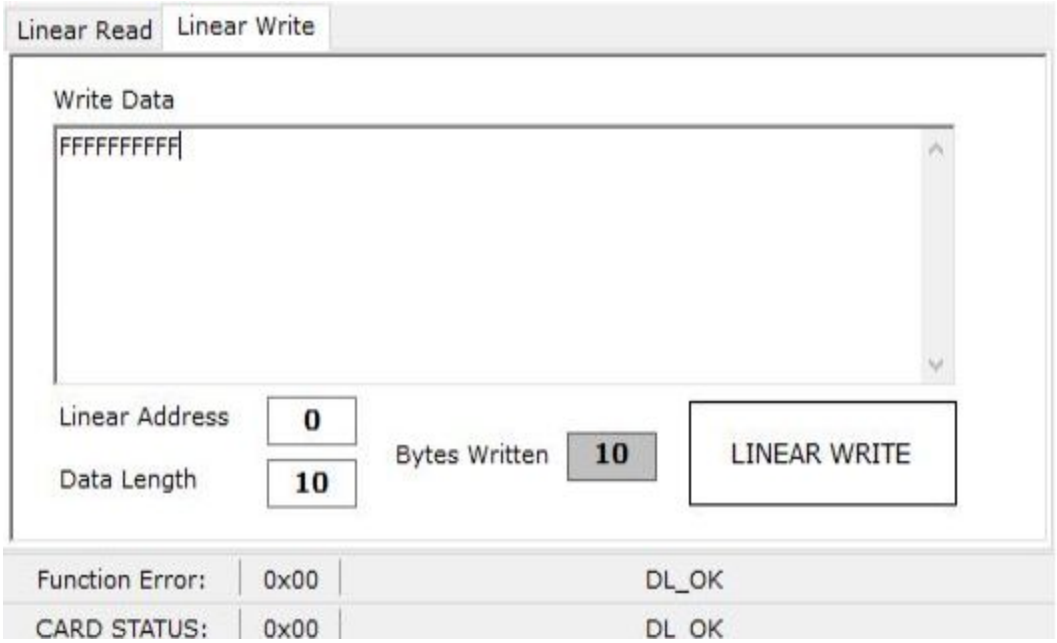
5. Format

- By clicking 'FORMAT CARD' which is on 'New Card Keys' tab, all data on the card will be erased and all sector keys will be set to 0xFFFFFFFFFFFF - 6 bytes.
- If you click on tab 'New Reader Key' you will be able to see button 'FORMAT READER KEYS' which will, after clicking, set all reader keys to 0xFFFFFFFFFFFF - 6 bytes.

6. Linear read and Write

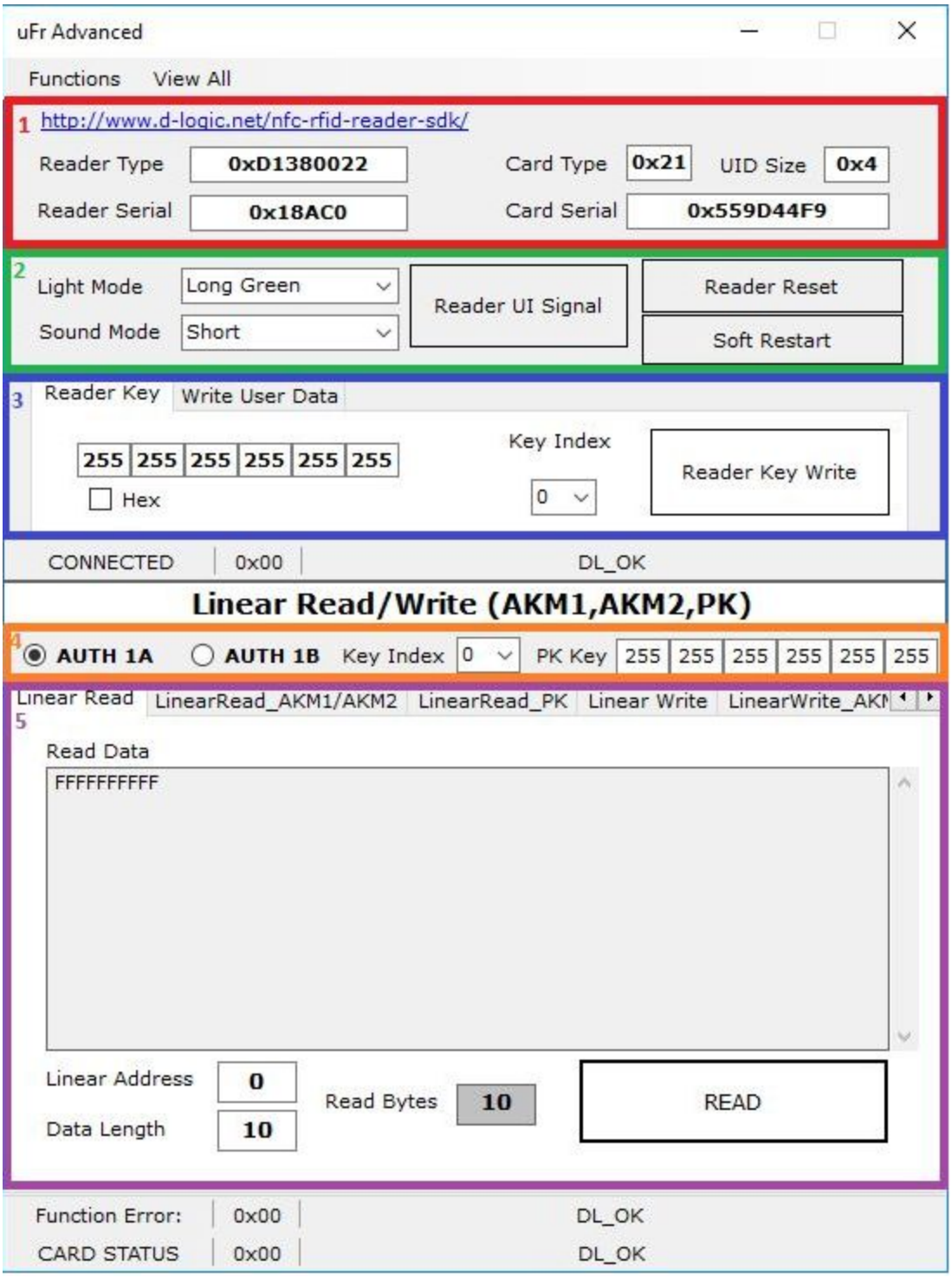
- On 'Linear Read' tab you have to choose linear address (where to start reading) and data length (how many bytes to read) and click 'LINEAR READ' button. After clicking you will be able to see card data in text box.

- On 'Linear Write' tab, you have to choose linear address (where to start writing) and input data into text box as shown in the picture below:



Data length will be automatically calculated. Bytes written shows a number of bytes that are written into card after clicking 'LINEAR WRITE' button.

Advanced


uFr Advanced
Functions
View All
1
http://www.d-logic.net/nfc-rfid-reader-sdk/
Reader Type
0xD1380022
Card Type
0x21
UID Size
0x4
Reader Serial
0x18AC0
Card Serial
0x559D44F9
2
Light Mode
Long Green
Sound Mode
Short
Reader UI Signal
Reader Reset
Soft Restart
3
Reader Key
Write User Data
255 255 255 255 255 255
Hex
Key Index
0
Reader Key Write
CONNECTED
0x00
DL_OK
Linear Read/Write (AKM1,AKM2,PK)
4
AUTH 1A
AUTH 1B
Key Index
0
PK Key
255 255 255 255 255 255
Linear Read
LinearRead_AKM1/AKM2
LinearRead_PK
Linear Write
LinearWrite_AKM
5
Read Data
FFFFFFFFFF
Linear Address
0
Data Length
10
Read Bytes
10
READ
Function Error:
0x00
DL_OK
CARD STATUS
0x00
DL_OK

1. ReaderOpen and ReaderOpenEx

This part of our application is same as the one in our Simplest example, it's used for opening communication with our uFR series reader. We implemented 'Advanced options' in which you input arguments necessary for our ReaderOpenEx() function. All you need to do is check the 'Use Advanced options' and provide data in specified fields. If use of Advanced options is not checked, our application will call standard ReaderOpen() function and will try to find reader connected to your PC.

2. Reader type, reader serial, card type and UID

After opening application and putting card on the reader you will see reader type and serial number, card type, card uid and card uid size represented as hexadecimal numbers as shown on the picture above.

3. Reader signalization and restart

You can choose reader light and sound mode from combo boxes and after clicking 'READER UI SIGNAL' signalization will be visible and you can hear sound from speaker.

Clicking 'Reader Reset' will cause physical reset of reader communication port.

If you click on button 'Soft Restart' it will restart the reader by software. It sets all readers parameters to default values and close RF field which resets all the cards in the field.

4. Reader keys and data

- In the 'Reader Key' tab you can see button 'Key Index' combo box in which you can choose between 0 - 31 key number to write into reader by clicking 'Reader Key Write' button.

- In the 'Write User Data' tab you can see text box with caption 'New User Data' in which you can type new user data and write it into reader by clicking 'Write User Data' button.

5. Authentication mode

You can choose between authentication with key A or authentication with key B by clicking on radio boxes in section number '4'.

Also, you can choose key index from combobox or enter Provided key (PK) - 6 bytes. They will be used depending on which tab you click in section '5' for linear reading and writing cards data.

- Linear Read - using Key Index
- LinearRead_AKM1/AKM2 - using auth mode (AUTH 1A or AUTH 1B)
- LinearRead_PK - using Provided key
- Linear Write - using Key Index
- LinearWrite_AKM1/AKM2 - using auth mode (AUTH1A or AUTH1B)
- LinearWrite_PK - using Provided key

6. Functions:

If you click on "Functions" at the top of the application, you will see dropdown list with more options for work.

6.1 Linear read / Linear write
6.2 Block read / Block write
6.3 Block in sector read / Block in sector write
6.4 Value block read / Value block write
6.5 Value block increment / Value block decrement
6.6 Value block in sector read / Value block in sector write
6.7 Value block in sector increment / Value block in sector decrement
6.8 Sector trailer write
6.9 Linear format card

6.1 Linear read / Linear write

Reading:

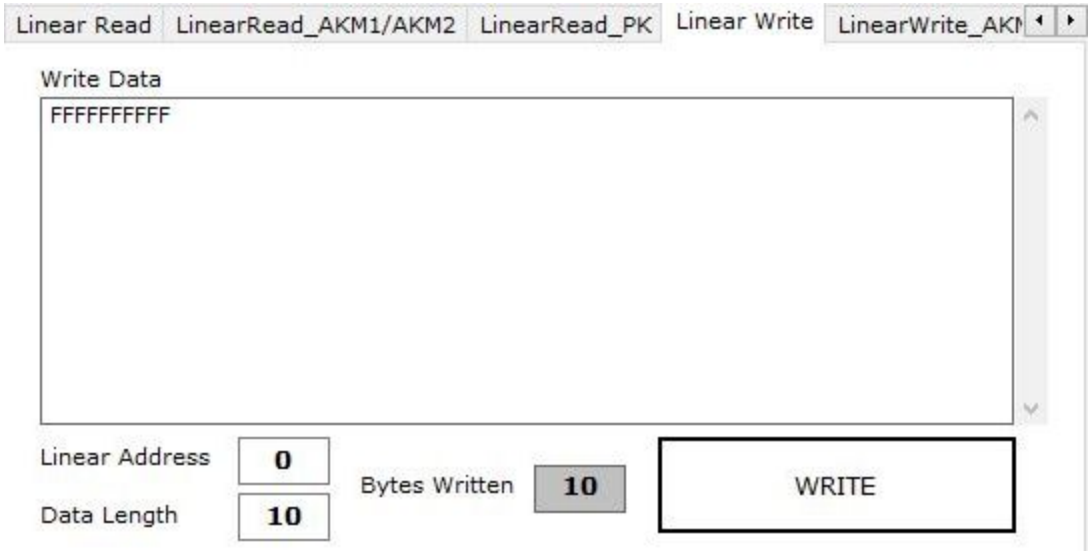
● On 'Linear Read' tab you have to choose key index and authentication mode (AUTH 1A or AUTH 1B) for reading which is in section '4', linear address (where to start reading) and data length (how many bytes to read) and click 'READ' button. After clicking you will be able to see card data in text box.

● On 'LinearRead_AKM1/AKM2' tab you have to choose authentication mode (AUTH 1A or AUTH 1B) for reading which is in section '4', linear address (where to start reading)
and data length (how many bytes to read) and click 'READ' button. After clicking you will be able to see card data in text box.

● On 'LinearRead_PK' tab you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) for reading which is in section '4', linear address (where to start reading) and data length (how many bytes to read) and click 'READ' button. After clicking you will be able to see card data in text box.

Writing:

● On 'Linear Write' tab, you have to choose key index and authentication mode (AUTH 1A or AUTH 1B) for writing which is in section '4', linear address (where to start writing) and input data into text box as shown in the picture below:



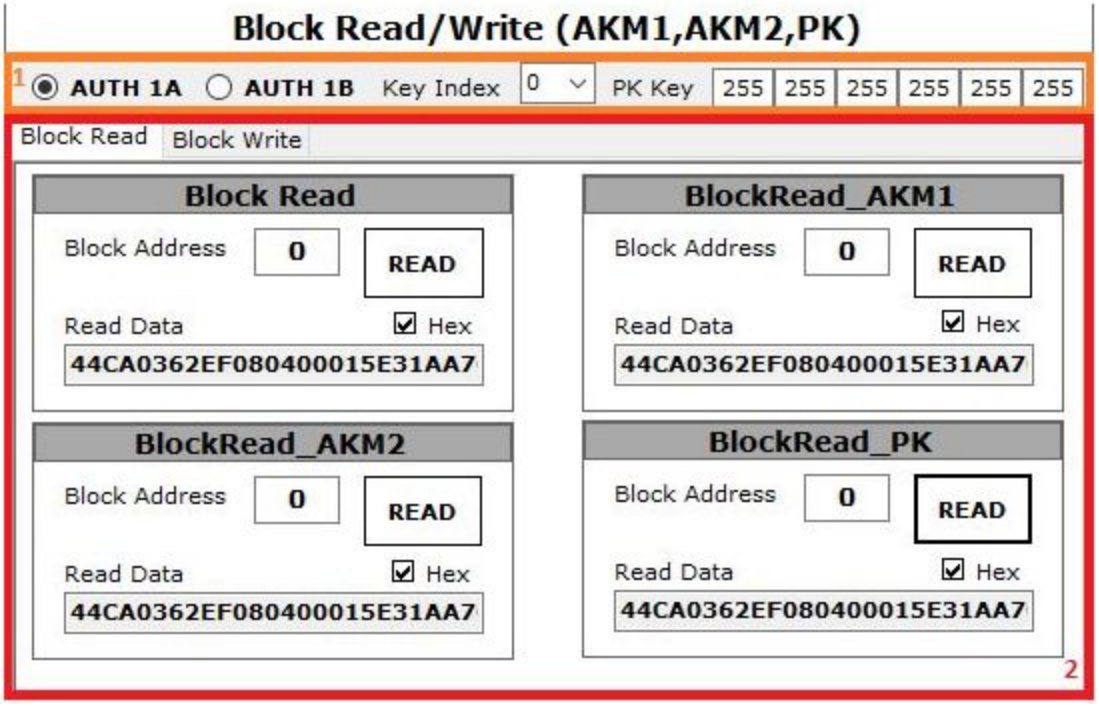
Data length will be automatically calculated. Bytes written shows a number of bytes that are written into card after clicking 'WRITE' button.

● On 'LinearWrite_AKM1/AKM2' tab, you have to choose authentication mode (AUTH 1A or AUTH 1B) for writing which is in section '4', linear address (where to start writing) and input data into text box. Data length will be automatically calculated. Bytes written shows a number of bytes that are written into card after clicking 'WRITE' button.

● On 'LinearWrite_PK' tab, you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) for writing which is in section '4', linear address (where to start writing) and input data into text box. Data length will be automatically calculated. Bytes written shows a number of bytes that are written into card after clicking 'WRITE' button.

6.2 Block read / Block write

Now, we will explain Block Read/Write option.



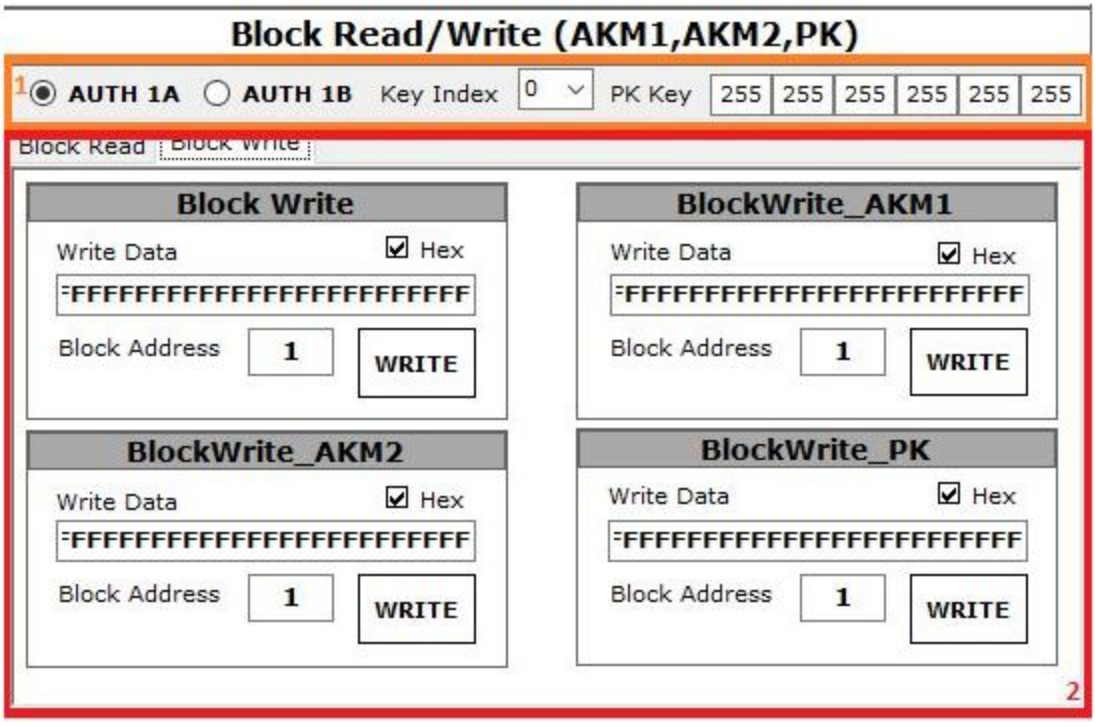
Block read:

● In ''Block Read'' window you can choose block address and ASCII or hex data representation by checking 'Hex' checkbox. For successful reading, you have to choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 data is shown at the picture above.

● In ''BlockRead_AKM1'' 'window you can choose block address and ASCII or hex data representation by checking 'Hex' checkbox. For successful reading,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 data is shown at the picture above.

● In ''BlockRead_AKM2'' 'window you can choose block address and ASCII or hex data representation by checking 'Hex' checkbox. For successful reading,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 data is shown at the picture above.

● In ''BlockRead_PK'' 'window you can choose block address and ASCII or hex data representation by checking 'Hex' checkbox. For successful reading,you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1'. Block 0 data is shown at the picture above.



Block write:

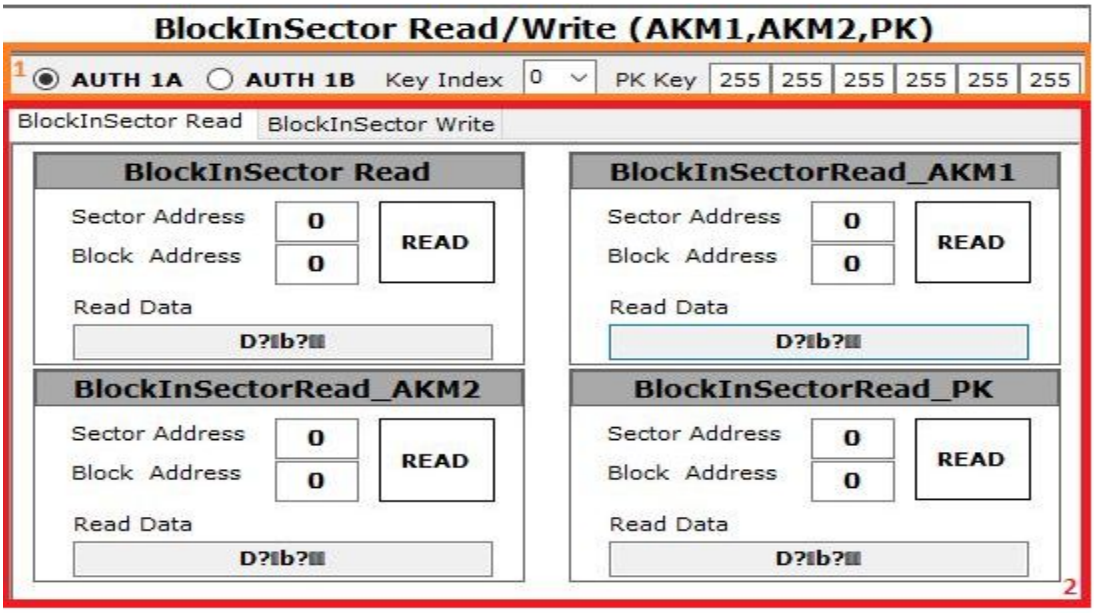
● In ''Block Write'' window you can choose block address and ASCII or hex data input by checking 'Hex' checkbox. For successful writing, you have to enter 16 bytes of data in textbox, choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) from section '1' and then click ''WRITE'' button. Block 1 data writing is shown at the picture above.

● In ''BlockWrite_AKM1'' 'window you can choose block address and ASCII or hex data input by checking 'Hex' checkbox. For successful writing, you have to enter 16 bytes of data in textbox, choose authentication mode (AUTH 1A or AUTH 1B) from section '1' and then click ''WRITE'' button. Block 1 data writing is shown at the picture above.

● In ''BlockWrite_AKM2'' 'window you can choose block address and ASCII or hex data input by checking 'Hex' checkbox. For successful writing, you have to enter 16 bytes of data in textbox, choose authentication mode (AUTH 1A or AUTH 1B) from section '1' and then click ''WRITE'' button. Block 1 data writing is shown at the picture above.

● In ''BlockWrite_PK'' 'window you can choose block address and ASCII or hex data input by checking 'Hex' checkbox. For successful writing,you have to enter 16 bytes of data in textbox, Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1' and then click '''WRITE'' button. Block 1 data writing is shown at the picture above.

6.3 Block in sector read / Block in sector write



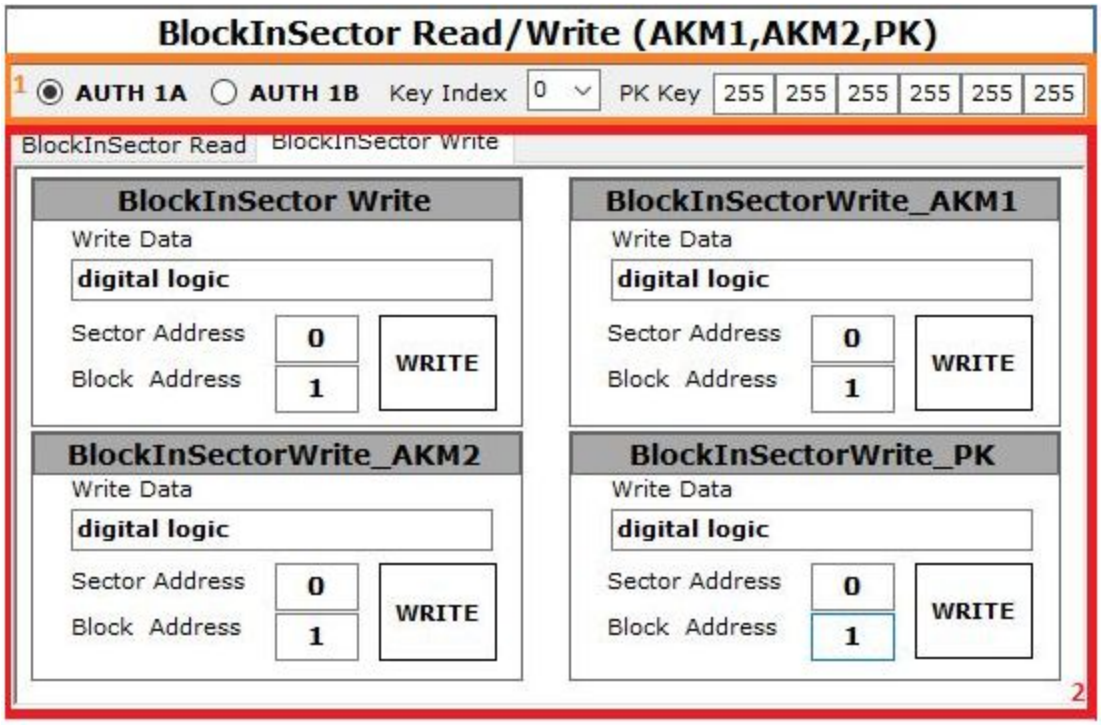
Block in sector read:

● In ''BlockInSector Read'' window you can choose sector address and block address. For successful reading, you have to choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 in sector 0 data is shown at the picture above.

● In ''BlockInSectorRead_AKM1'' 'window you can choose sector address and block address. For successful reading,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 in sector 0 data is shown at the picture above.

● In ''BlockInSectorRead_AKM2'' 'window you can choose sector address and block address. For successful reading,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 0 in sector 0 data is shown at the picture above.

● In ''BlockInSectorRead_PK'' 'window you can choose sector address and block address. For successful reading,you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1'. Block 0 in sector 0 data is shown at the picture above.



Block in sector write:

● In ''BlockInSector Write' window you can choose sector address and block address and enter ASCII data For successful writing, you have to choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 1 in sector 0 data writing is shown at the picture above.

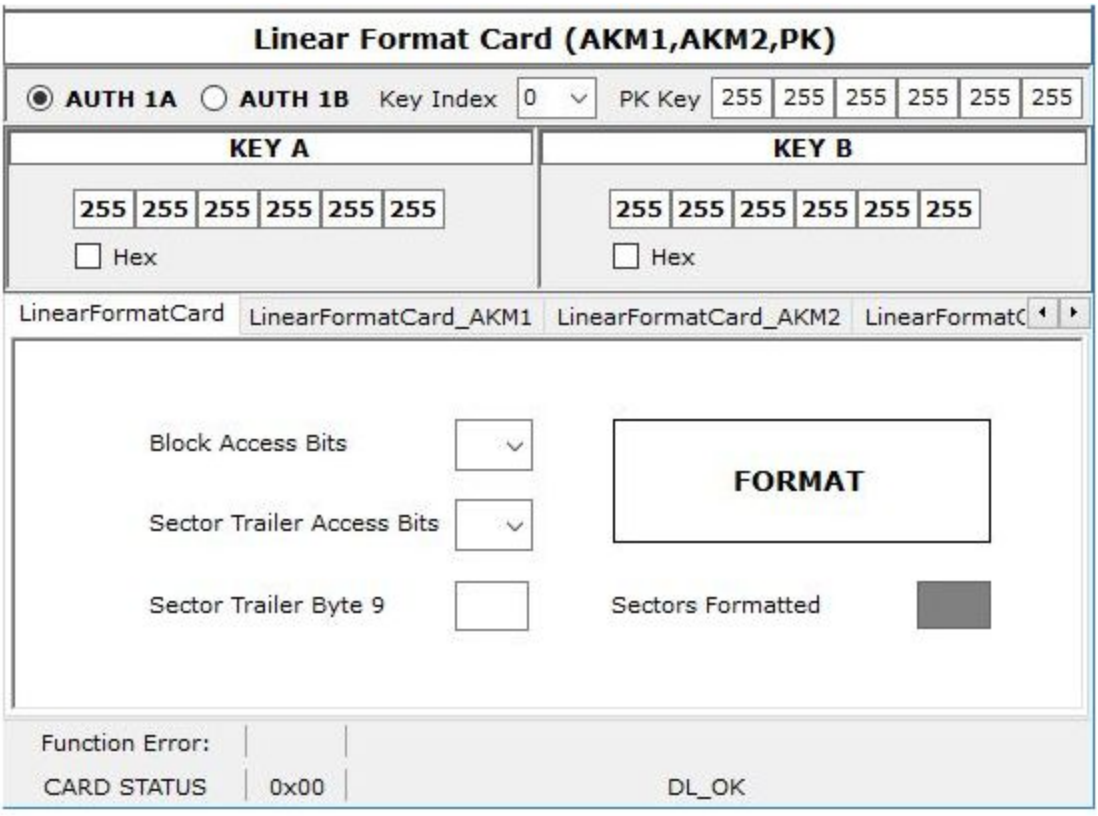
● In ''BlockInSectorWrite_AKM1" window you can choose sector address and block address and enter ASCII data. For successful writing,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 1 in sector 0 data writing is shown at the picture above.

● In ''BlockInSectorWrite_AKM2" window you can choose sector address and block address and enter ASCII data. For successful writing,you have to choose authentication mode (AUTH 1A or AUTH 1B) from section '1'. Block 1 in sector 0 data writing is shown at the picture above.

● In ''BlockInSectorWrite_PK" 'window you can choose sector address and block address and enter ASCII data. For successful writing,you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1'. Block 1 in sector 0 data writing is shown at the picture above.

VALUE BLOCKS

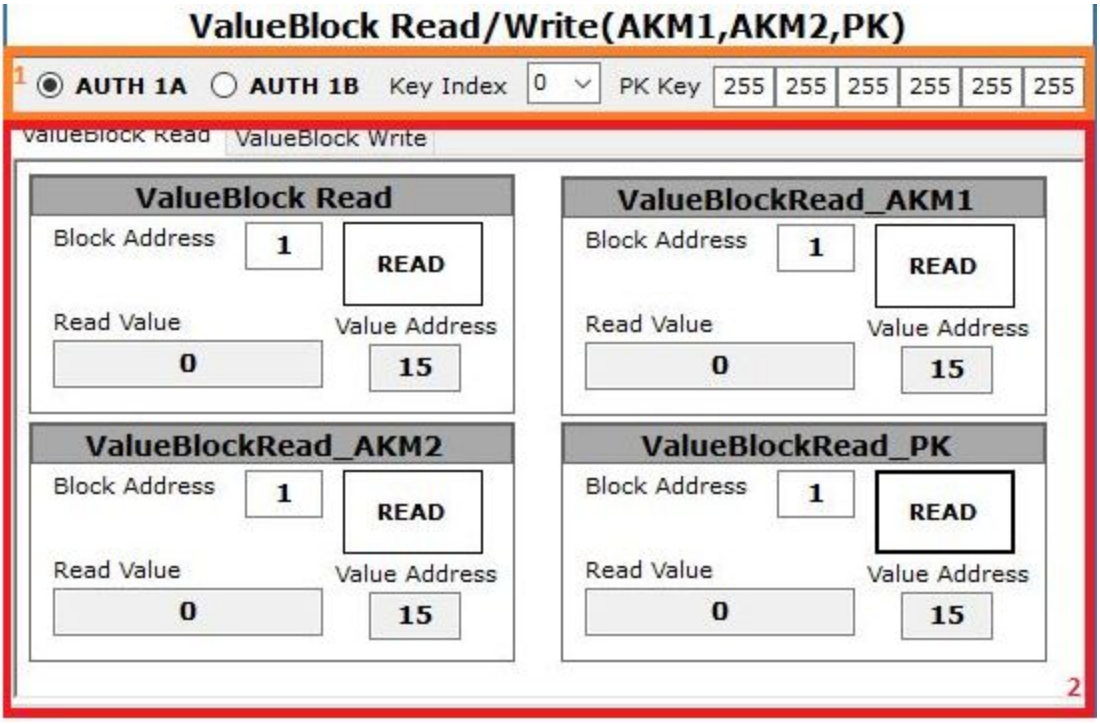
If you want to configure blocks for value, you have to change blocks access bits. Click on “Functions” dropdown list at the top of the application and then select ‘’Linear Format Card’’ option.



For configuring blocks as value blocks please refer to:

https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr-doc/blob/master/uFR%20Series%20NFC%20reader%20API.pdf
and look for “block access bits” and “sector trailer access bits”.

6.4 Value block read / Value block write



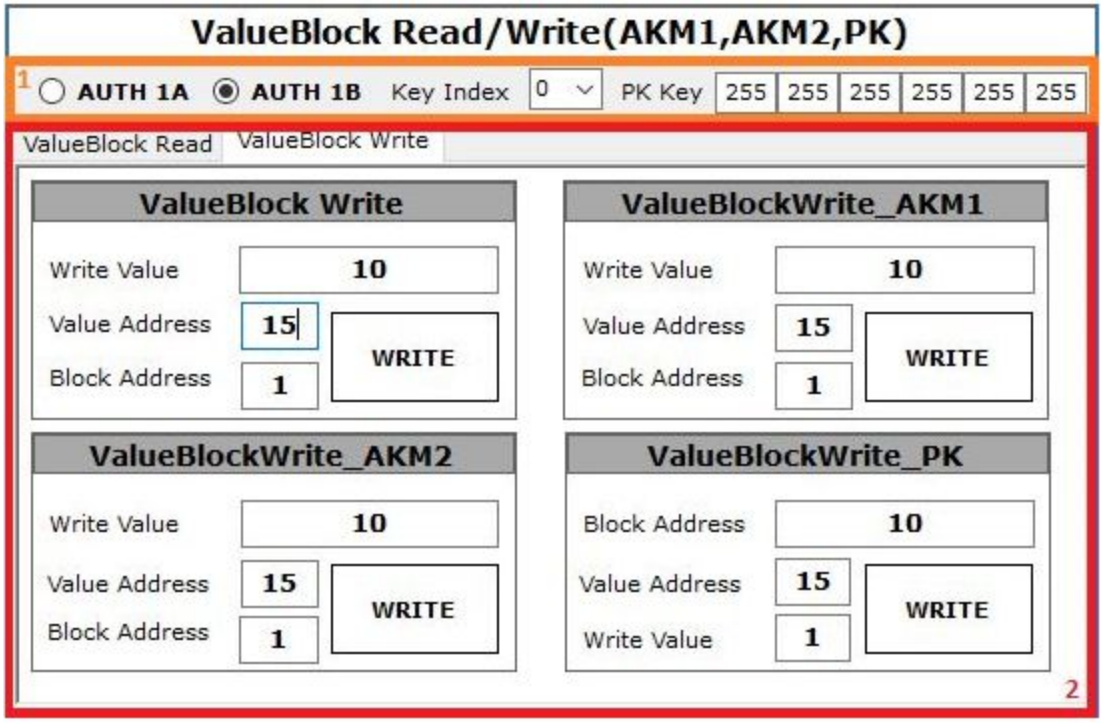
Value block read:

● In "ValueBlock Read" window you have to choose block address, appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''READ'' button. Block 1 value reading is shown above

● In "ValueBlockRead_AKM1" window you have to choose block address and authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''READ'' button. Block 1 value reading is shown above

● In "ValueBlockRead_AKM2" window you have to choose block address and authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''READ'' button. Block 1 value reading is shown above.

● In "ValueBlockRead_PK" window you have to choose block address and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1', then click ''READ'' button. Block 1 value reading is shown above.



Value block write:

● In "ValueBlock Write" you have to enter value, value address, block address and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''WRITE'' button. Block 1 value writing is shown above.

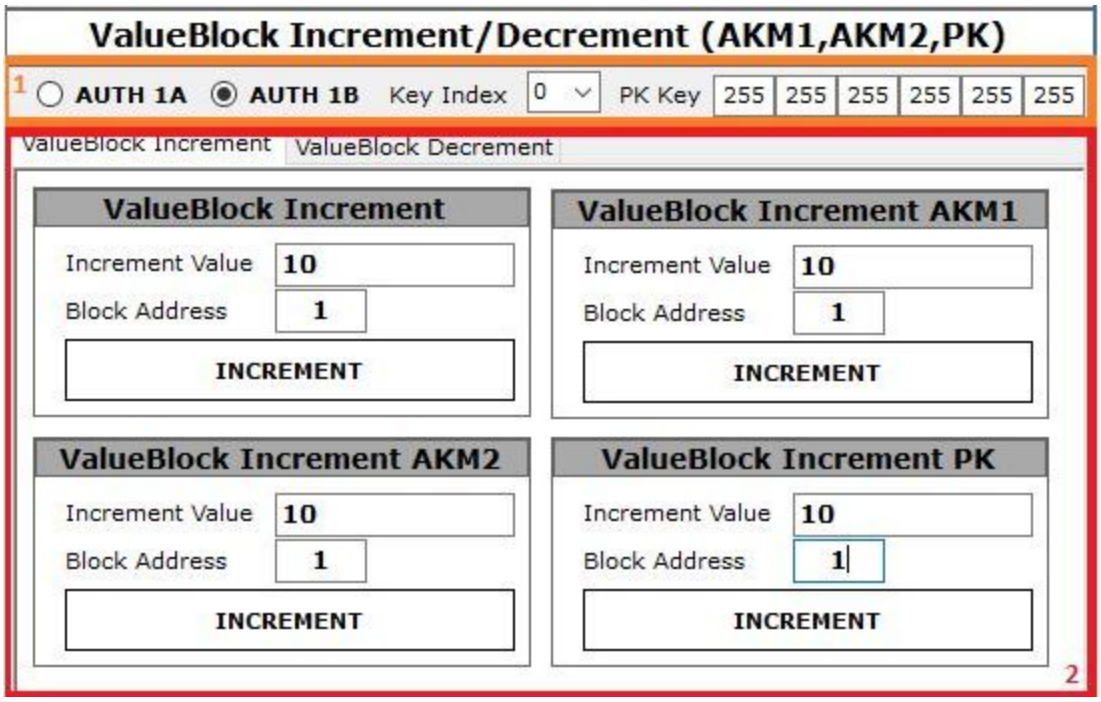
● In "ValueBlockWrite_AKM1" you have to enter value, value address, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''WRITE'' button. Block 1 value writing is shown above.

● In "ValueBlockWrite_AKM2" you have to enter value, value address, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''WRITE'' button. Block 1 value writing is shown above.

● In "ValueBlockWrite_PK" you have to enter value, value address, block address and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1', then click ''WRITE'' button. Block 1 value writing is shown above.

6.5 Value block increment / Value block decrement

Value block increment:



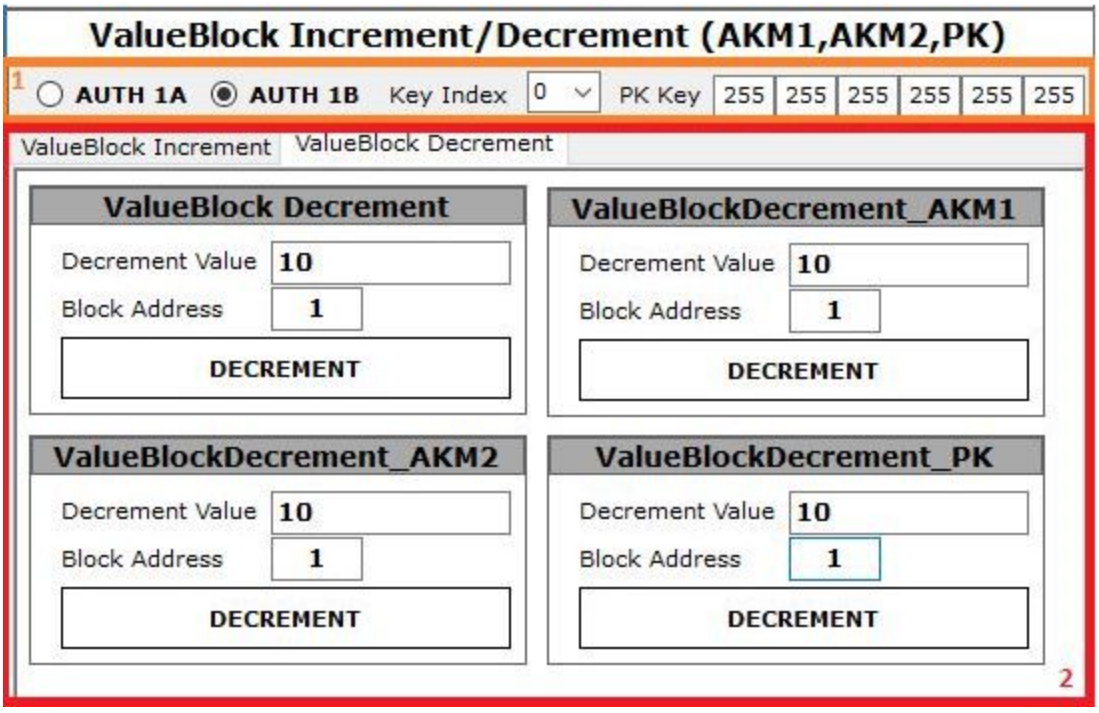
● In "ValueBlock Increment" window you have to enter increment value, block address, and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''INCREMENT'' button. Block 1 value incrementing is shown above.

● In "ValueBlock Increment AKM1" window you have to enter increment value, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''INCREMENT'' button. Block 1 value incrementing is shown above.

● In "ValueBlock Increment AKM2" window you have to enter increment value, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''INCREMENT'' button. Block 1 value incrementing is shown above.

● In "ValueBlock Increment PK" window you have to enter increment value, block address and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1', then click ''INCREMENT'' button. Block 1 value incrementing is shown above.

Value block decrement:



● In "ValueBlock Decrement" window you have to enter decrement value, block address, and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''DECREMENT'' button. Block 1 value decrementing is shown above.

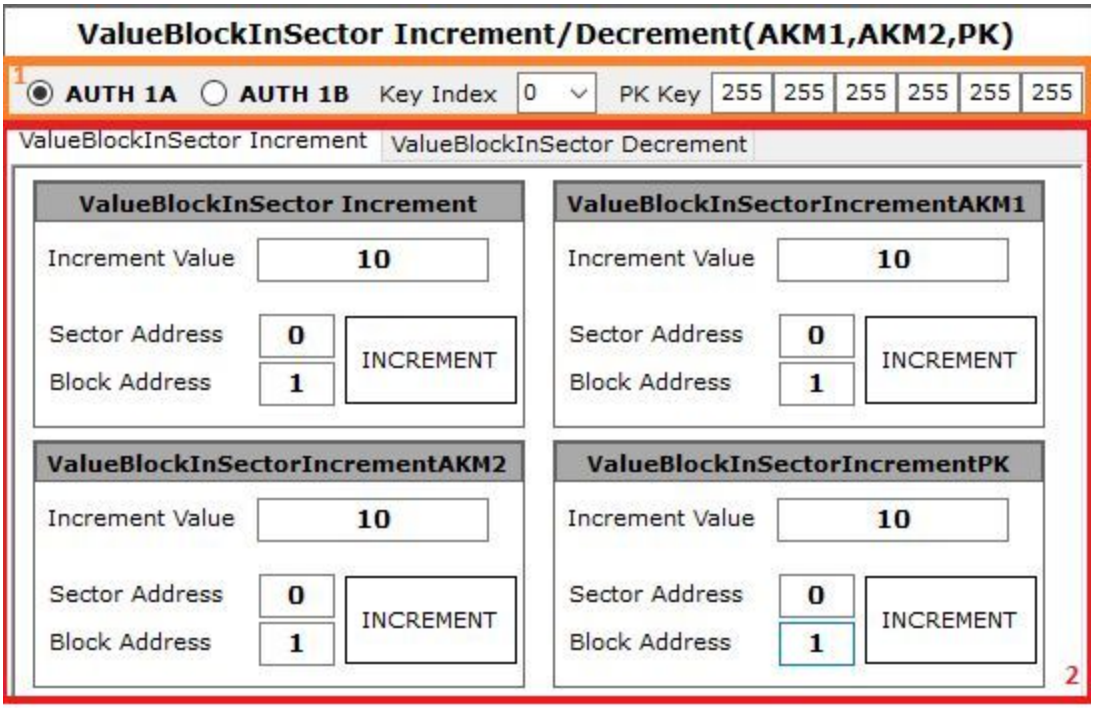
● In "ValueBlock Decrement AKM1" window you have to enter decrement value, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''DECREMENT'' button. Block 1 value decrementing is shown above.

● In "ValueBlock Decrement AKM2" window you have to enter decrement value, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''DECREMENT'' button. Block 1 value decrementing is shown above.

● In "ValueBlock Decrement PK" window you have to enter decrement value, block address and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1', then click ''INCREMENT'' button. Block 1 value decrementing is shown above.

6.7 Value block in sector increment / Value block in sector decrement

Value block in sector increment:



● In "ValueBlockInSector Increment" window you have to enter increment value, sector address, block address and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''INCREMENT'' button. Block 1 in sector 0 value incrementing is shown above.

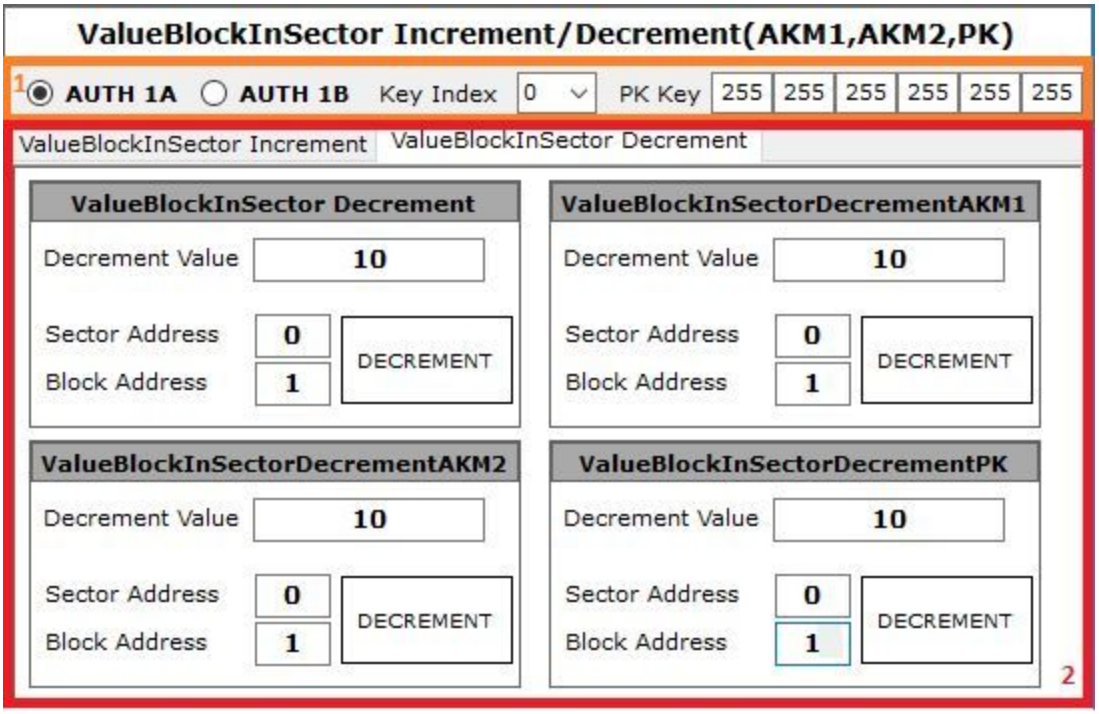
● In "ValueBlockInSector Increment AKM1" window you have to enter increment value, sector address, block address and choose authentication mode (AUTH 1A or AUTH 1B)
which is in section '1', then click ''INCREMENT'' button. Block 1 in sector 0 value incrementing is shown above.

● In "ValueBlockInSector Increment AKM2" window you have to enter increment value, sector address, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''INCREMENT'' button. Block 1 in sector 0 value incrementing is shown above.

● In "ValueBlockInSector Increment PK" window you have to enter increment value, sector address, block address you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255

255 255 255 decimal) which is in section '1', then click ''INCREMENT'' button. Block 1 in sector 0 value incrementing is shown above.

Value block in sector decrement:



● In "ValueBlockInSector Decrement" window you have to enter decrement value, sector address, block address and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which are in section '1', then click ''DECREMENT'' button. Block 1 in sector 0 value decrementing is shown above.

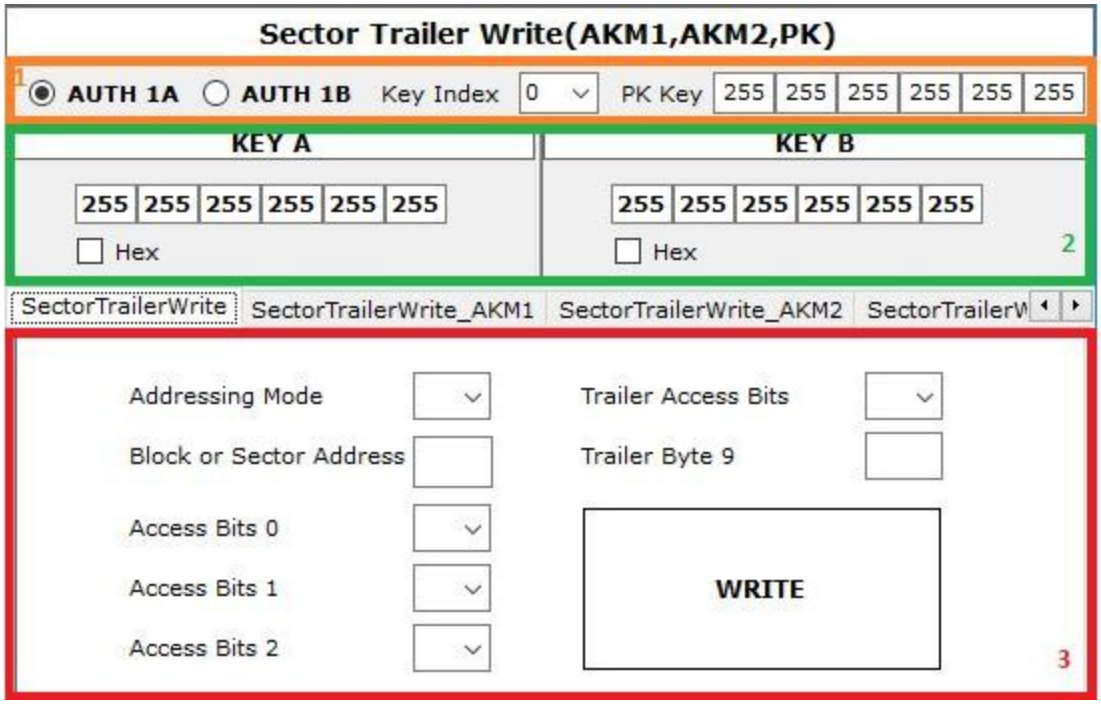
● In "ValueBlockInSector Decrement AKM1" window you have to enter decrement value, sector address, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''DECREMENT'' button. Block 1 in sector 0 value decrementing is shown above.

● In "ValueBlockInSector Decrement AKM2" window you have to enter decrement value, sector address, block address and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''DECREMENT'' button. Block 1 in sector 0 value decrementing is shown above.

● In "ValueBlockInSector Decrement PK" window you have to enter decrement value, sector address, block address you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255

255 255 255 decimal) which is in section '1', then click ''DECREMENT'' button. Block 1 in sector 0 value decrementing is shown above.

6.8 Sector trailer write

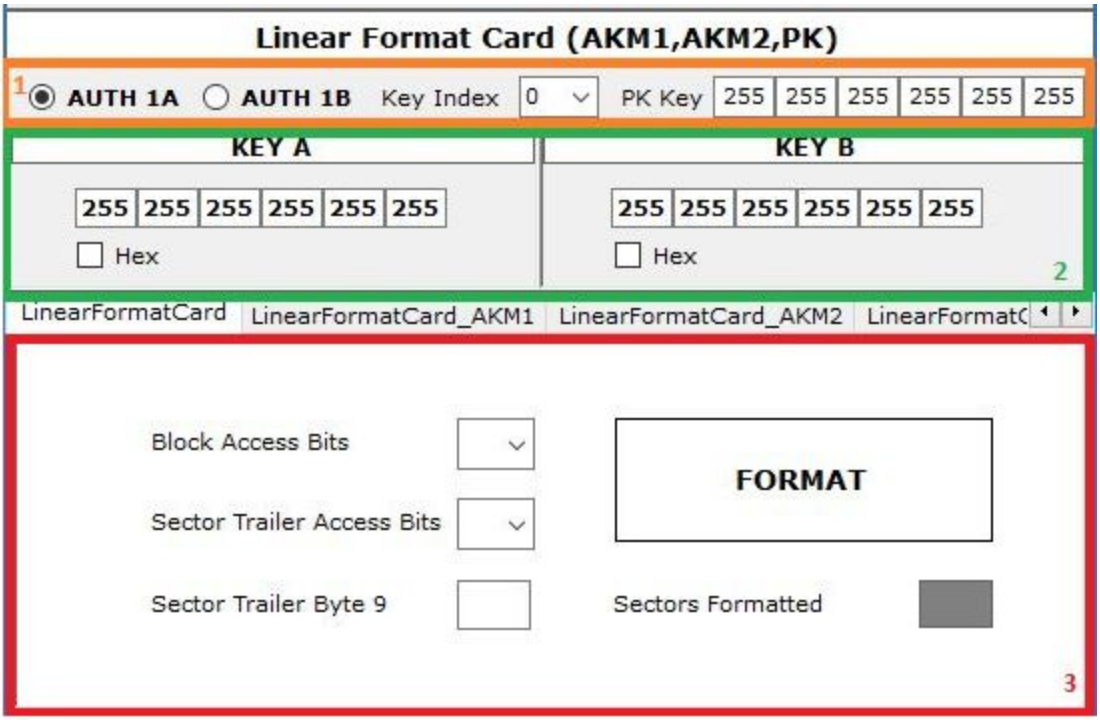


● In ''SectorTrailerWrite'' tab you have to enter new key A and new key B which are in section '2', choose addressing mode (0 - absolute or 1 - relative), sector address, block 0 access bits, block 1 access bits, block 2 access bits, sector trailer access bits, sector trailer byte 9 which are in section '3' and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''WRITE'' button.

● In ''SectorTrailerWrite_AKM1'' tab you have to enter new key A and new key B which are in section '2', choose addressing mode (0 - absolute or 1 - relative), sector address, block 0 access bits, block 1 access bits, block 2 access bits, sector trailer access bits, sector trailer byte 9 which are in section '3' and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''WRITE'' button.

● In ''SectorTrailerWrite_AKM2'' tab you have to enter new key A and new key B which are in section '2', choose addressing mode (0 - absolute or 1 - relative), sector address, block 0 access bits, block 1 access bits, block 2 access bits, sector trailer access bits, sector trailer byte 9 which are in section '3' and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''WRITE'' button.

● In ''SectorTrailerWrite_PK'' tab you have to enter new key A and new key B which are in section '2', choose addressing mode (0 - absolute or 1 - relative), sector address, block 0 access bits, block 1 access bits, block 2 access bits, sector trailer access bits, sector trailer byte 9 which are in section '3' and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section '1', then click ''WRITE'' button.



● In "LinearFormatCard" tab you have to enter new key A and new key B which are in section '2', block access bits, sector trailer access bits and sector trailer byte 9 which are in section '3' and choose appropriate key index and authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''FORMAT'' button.

● In "LinearFormatCard_AKM1" tab you have to enter new key A and new key B which are in section '2', block access bits, sector trailer access bits and sector trailer byte 9 which are in section '3' and choose authentication mode (AUTH 1A or AUTH 1B) which is in section '1', then click ''FORMAT'' button.

● In “LinearFormatCard_AKM2” tab you have to enter new key A and new key B which are in section ‘2’, block access bits, sector trailer access bits and sector trailer byte 9 which are in section ‘3’ and choose authentication mode (AUTH 1A or AUTH 1B) which is in section ‘1’, then click ‘’FORMAT’’ button.

● In “LinearFormatCard_PK” tab you have to enter new key A and new key B which are in section ‘2’, block access bits, sector trailer access bits and sector trailer byte 9 which are in section ‘3’ and you have to enter Provided key (6 bytes - 0xFFFFFFFFFFFF is default hex or 255 255 255 255 255 255 decimal) which is in section ‘1’, then click ‘’FORMAT’’ button.

Revision history

Date	Version	Comment
2019-04-09	1.0	Base document